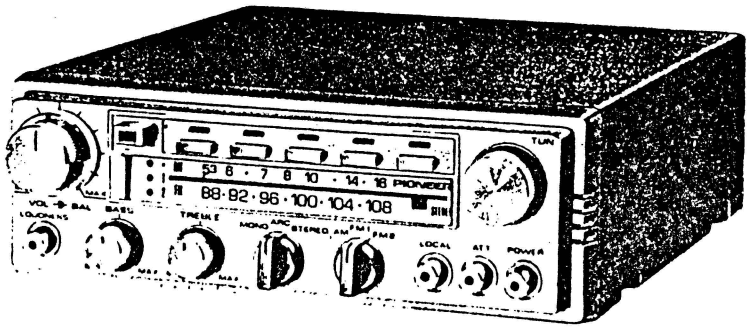
GEX-8 E

ARC TUNER COMPONENT CAR STEREO
AM/FM ELECTRONIC TUNER

SERVICE MANUAL



SPECIFICATIONS

General

Power source	DC 13.8V (11 ~ 16V allowable)
Grounding system	Negative type
Tone controls	Bass: ± 10 dB (100 Hz)
	Treble: ± 10 dB (10 kHz)
Loudness contour	+ 12 dB (100 Hz),
Volume: − 30 dB)	+ 4 dB (10 kHz)
Attenuator	20 dB
Maximum output level	More than 200 mV
Output impedance	100Ω
Dimensions (W × H × D)	150 × 50 × 167 mm
Weight	1.3 kg

FM tuner

Frequency range	88 ~ 108 MHz
Usable sensitivity	13.8 dBf (1.9μV/150Ω)
50 dB quieting sensitivity	17.5 dBf (2.9μV/150Ω, mono)
	39.8 dBf (38μV/150Ω, stereo)
Signal-to-noise ratio	60 dB
Capture ratio	2 dB
Selectivity	70 dB (± 400 kHz)
Image rejection	45 dB
IF rejection	80 dB
Distortion	0.5% (at 60 dB, 400 Hz, mono)
	0.5% (at 60 dB, 1 kHz, stereo)
Frequency response	30 ~ 15,000 Hz (± 3 dB)
Muting level	17.5 dBf (2.9μV/150Ω)
Stereo separation	32 dB (at 60 dB, 1 kHz)

AM tuner

Frequency range	530 ~ 1,605 kHz
Sensitivity	40μV
Selectivity	40 dB (± 9 kHz)
Local/Distant switch effect	14 dB attenuation
Max. input signal (distortion 5%)	125 dB

Note:
Specifications and the design subject to possible modification without notice due to improvements.

PIONEER

3.1 FM IF ADJUSTMENT

• Connection Diagram

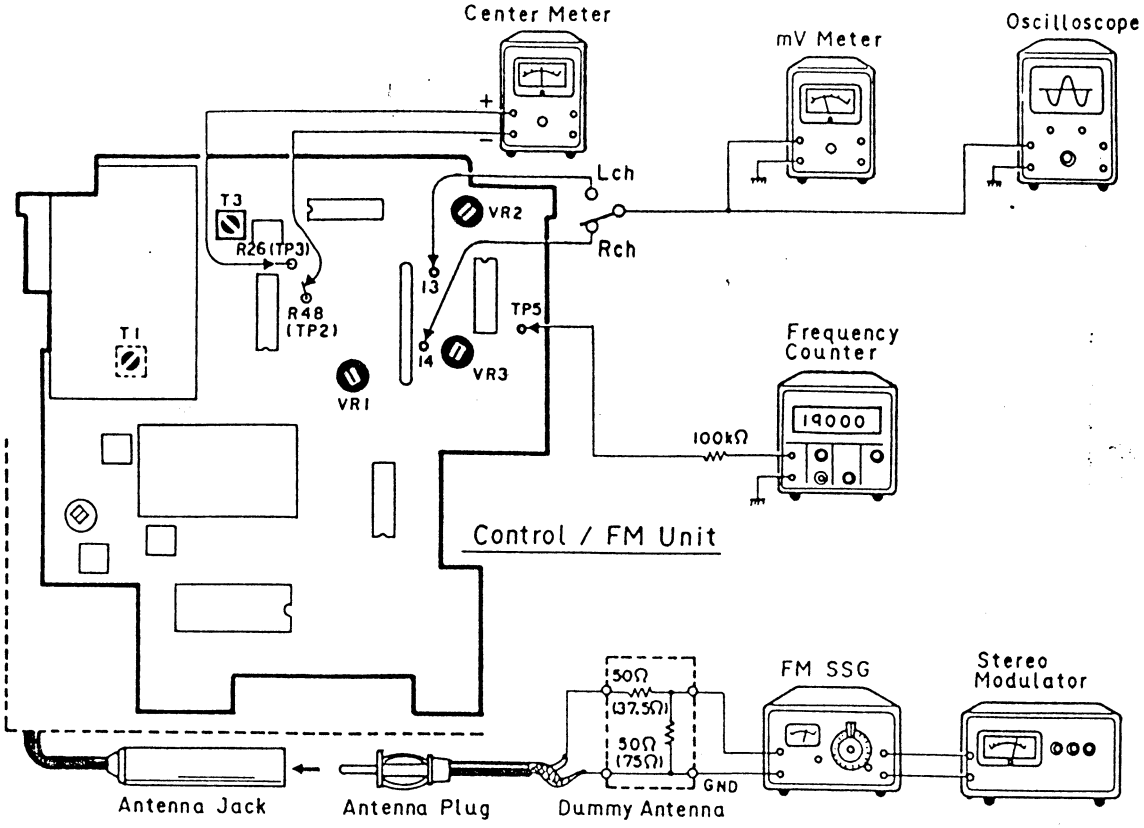


Fig. 7

• To Adjust

1. Add input signal of zero from SSG and adjust T3 so that the pointer of center meter (use one graduated for over 200μA) will come to the center.
2. Add output signal of 98 MHz 60 dB from SSG, multi-signal of modulated frequency 1 kHz of stereo modulator and tune to 98 MHz on the dial (the pointer of the center meter is at the center).
3. Adjust T1 so that separated signal will be minimal in its distortion factor.
4. Adjust FM IF by repeating the above procedure, steps 1,2 and3.

3.2 IF/MPX ADJUSTMENT

1. Shown in Fig. 7.
2. Select the band selector switch to stereo position.
3. Obtain non-modulation signal by setting SSG output at 60 dB (μV) 98 MHz. Adjust VR2 so that the frequency counter indicates 19 kHz ± 30 Hz.
4. Obtain stereo modulation signal by setting SSG output at 60 dB (μV). Adjust VR3 to secure maximum separation.

3.3 AUTO LEVEL ADJUSTMENT

1. Shown in Fig. 7.
2. Select the band selector switch to ARC position.
3. Set SSG at 98 MHz and tune using the tuning knob.
4. As SSG output gradually drops from 60 dB (μV) to low level, and SSG output reduced to 35 ± 2 dB (μV), turn VR1 carefully and set it where stereo indicator is turned off.

3.4 FM TRACKING ADJUSTMENT

• Connection Diagram

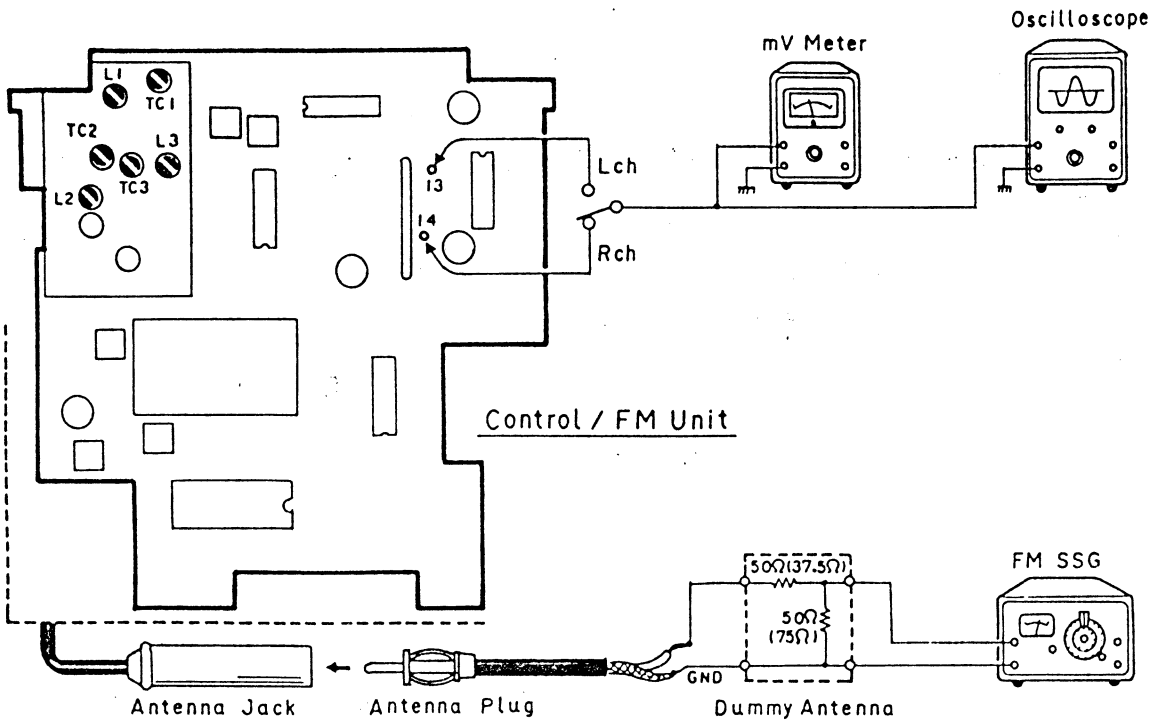


Fig. 8

• To Adjust

SSG Frequency	Pointer Position	Adjustment point	Note
1. 87.0 MHz (400 Hz, 100% modulation), output level 8 dB (μV)	Minimum	L3	87.0 MHz can be received
2. 108.6 MHz (400 Hz, 100% modulation), output level 8 dB (μV)	Maximum	TC3	108.6 MHz can be received
3. Repeat items (1) and (2) alternately so that broadcast can be received at the frequency between 87.0 MHz and 108.6 MHz.			
4. 90 MHz (400 Hz, 100% modulation), output level 5 dB (μV)	Tuned position	L1, L2	Maximum output
5. 106 MHz (400 Hz, 100% modulation), output level 5 dB (μV)	Tuned position	TC1, TC2	Maximum output
6. Repeat items (4) and (5) alternately so that the mV meter indicates maximum output.			

NNECTION DIAGRAM

1 | 2 | 3 | 4 | 5 | 6 | 7

ANT
ANTENNA JACK

ANT P.W. BOARD

CONTROL/FM UNIT

MEMORY1

IC 8 PD4003

Q9:2SA952-L

IC 9 PD1002

Q10:2SA798-F
Q11:2SC1583-F

CWW-014

IC2 LA1230P

Q2:2SC1674-K

Q3:2SC1675

Q1 SD306PA

D1~3
ITT 310PC or
ITT 310PD

IC3 LA2101

IC 6 M54834P

Q4,7,8,12,13 2SC1815-B

Q6:2SC1583-F

Q5: 2SB743-P

IC4 LA3350P-T

IC5 PST-506

SWITCH (CS

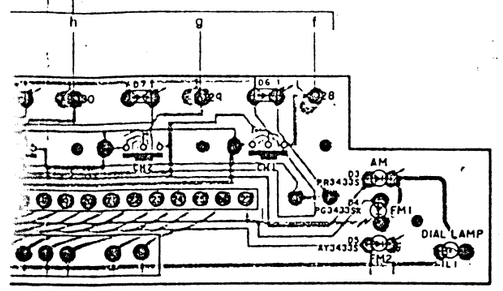
GENERATOR UNIT (CWM-038)

FILTER UNIT (CWX-344)

TO BATTERY
(13.8V)

FUSE 0.5A

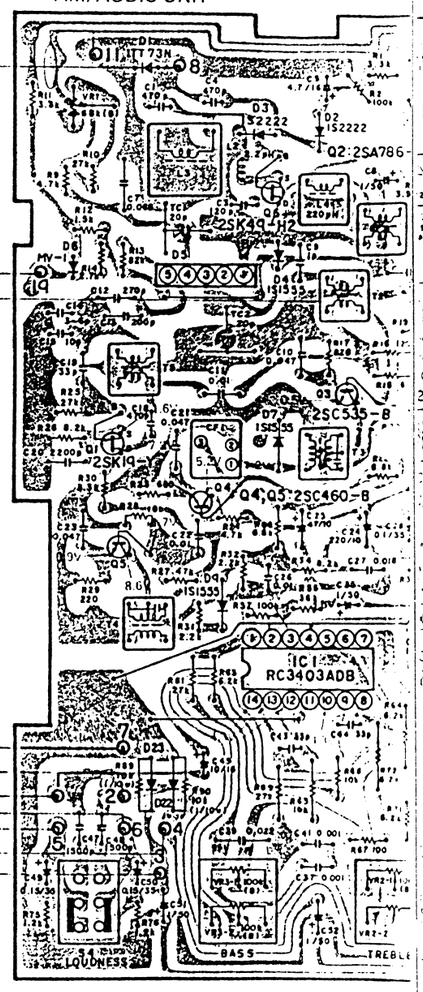
FU1

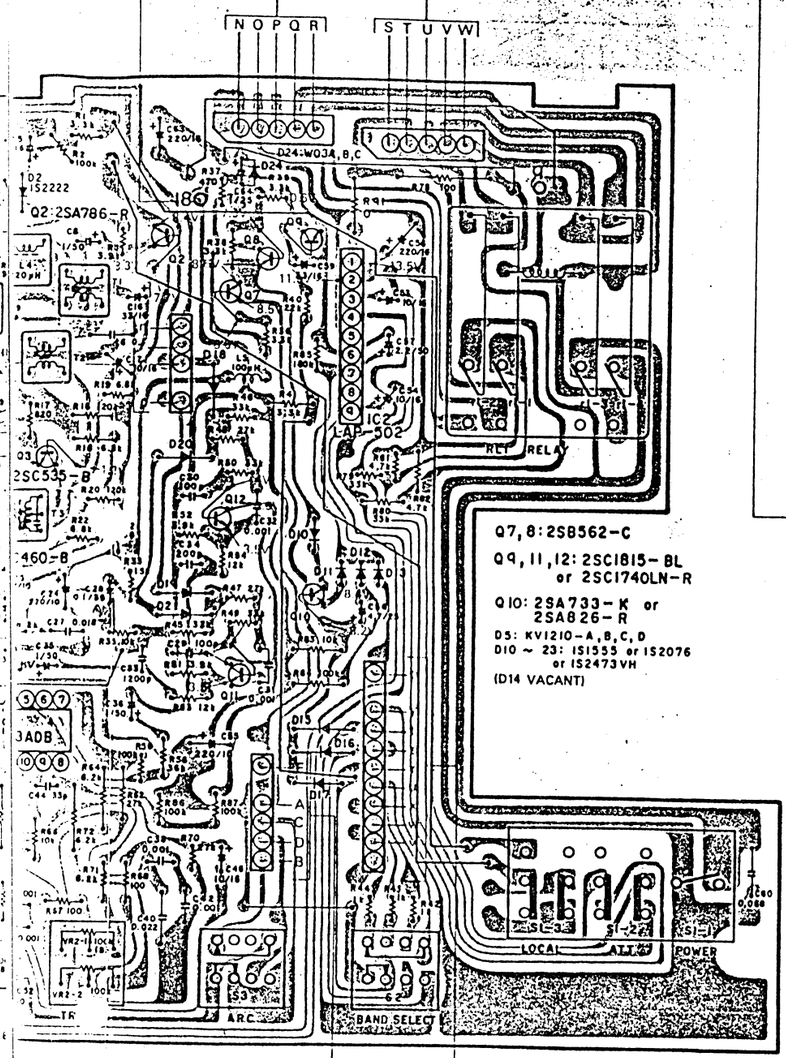


SWITCH (CSG-132)

VOLUME UNIT

AM/AUDIO UNIT





Q7,8:2SB562-C
Q9,11,12:2SC1815-BL or 2SC1740LN-R
Q10: 2SA733-K or 2SA826-R
D5: KV1210-A,B,C,D
D10 ~ 23: IS1555 or IS2076 or IS2473VH
(D14 VACANT)

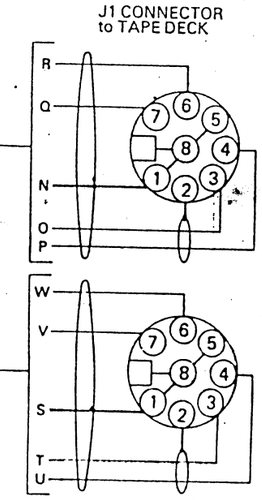
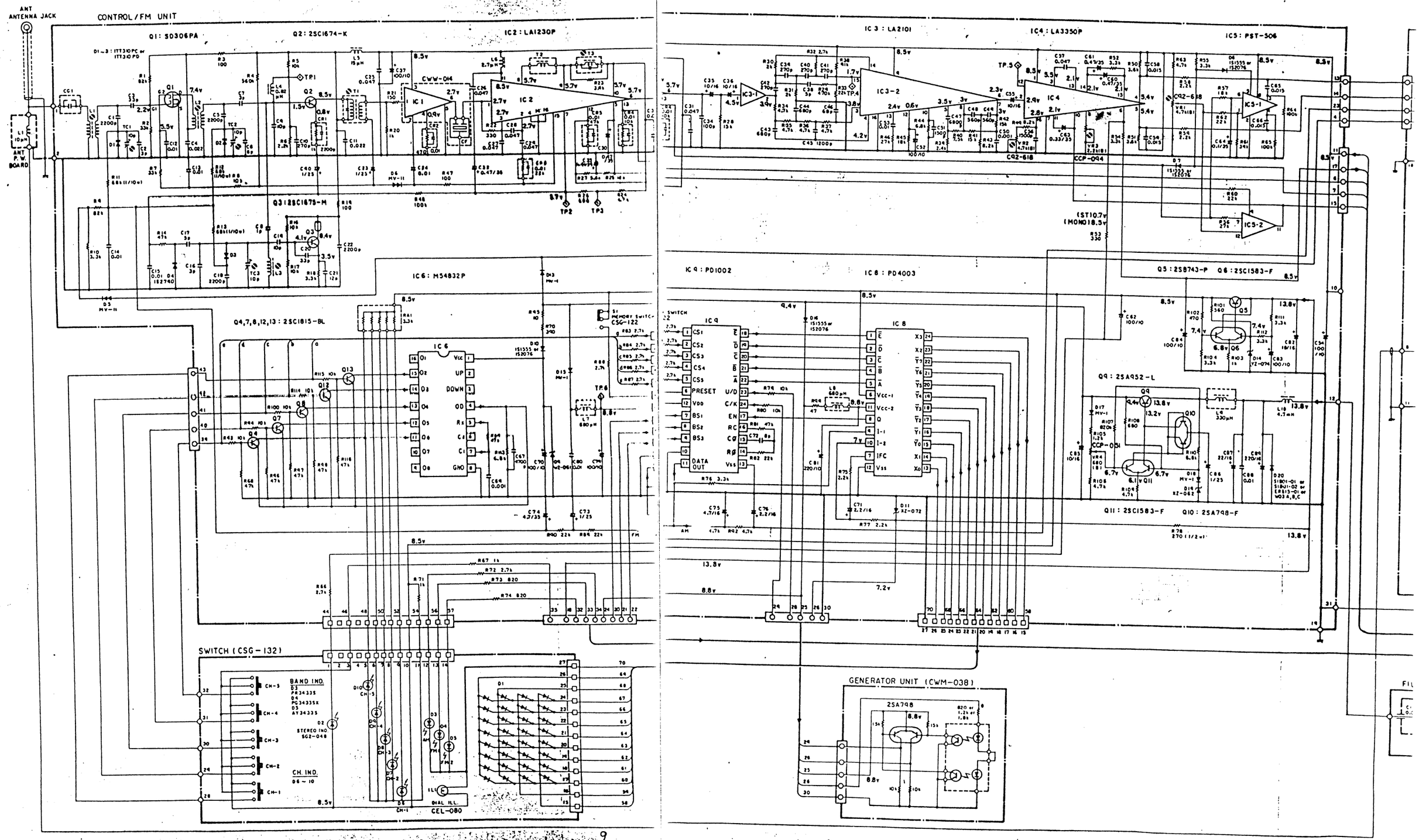


Fig. 12

CHEMATIC CIRCUIT DIAGRAM

1 | 2 | 3 | 4 | 5 | 6



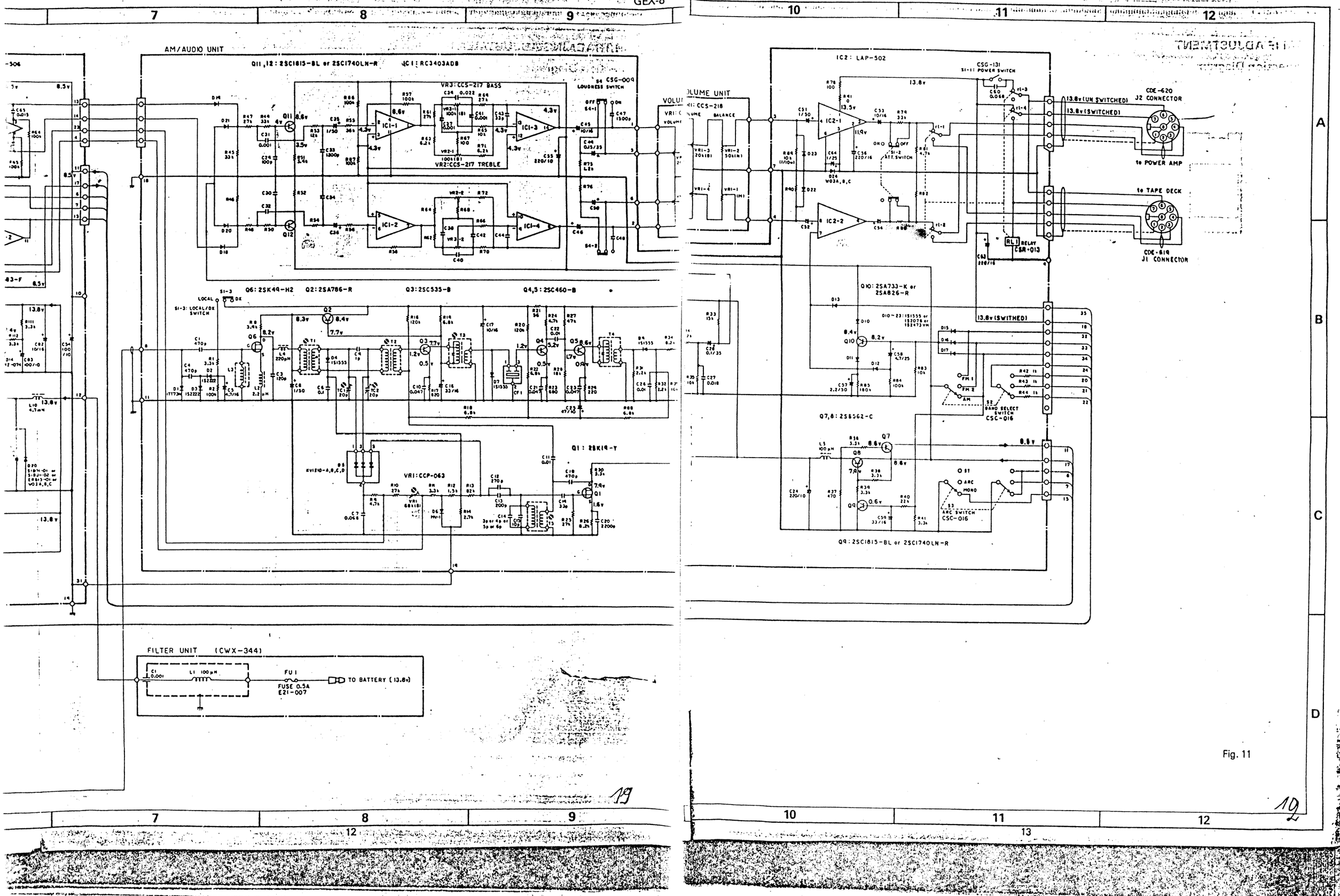

AM/AUDIO UNIT
Q11,12: 2SC1815-BL or 2SC1740LN-R
IC1: RC3403ADB
VR3: CCS-217 BASS
VR2: CCS-217 TREBLE
S4 CSG-009 LOUDNESS SWITCH
VOLUME UNIT
VR1: CCS-218
Q6: 2SK49-H2
Q2: 2SA786-R
Q3: 2SC535-B
Q4,5: 2SC460-B
S1-3: LOCAL/DX SWITCH
Q1: 2SK19-Y
VR1: CCP-063
FILTER UNIT (CWX-344)
C1 0.001
L1 100μH
FU1
FUSE 0.5A
E21-007
TO BATTERY (13.8V)
IC2: LAP-502
CSG-131
S1-1 POWER SWITCH
13.8V (UN SWITCHED)
13.8V (SWITCHED)
CDE-620
J2 CONNECTOR
to POWER AMP
to TAPE DECK
CDE-619
J1 CONNECTOR
RL1 RELAY
CSR-013
S1-2 ATT. SWITCH
Q10: 2SA733-K or 2SA826-R
D10~23: 1S1555 or 1S2078 or 1S2473 VM
Q7,8: 2SB562-C
S2 BAND SELECT SWITCH CSC-016
S3 ARC SWITCH CSC-016
Q9: 2SC1815-BL or 2SC1740LN-R

Fig. 11

PARTS LIST

RESISTORS

Part No.	Symbol & Description	
RD1/8VS□□□J	R1-R8, R10, R14, R16-R25, R27-R47, R49-R77, R79-R88, R93-R104, R107-R116	
CCN-037	R9	82kΩ
CCN-041	R11-R13	68kΩ
VACANT	R15	
RD1/8PS□□□J	R26, R48	
RD1/2PS271J	R78	
CCN-036	R89, R90	22kΩ
CCN-052	R91, R92, R106	47kΩ
CCN-034	R105	1.2kΩ

CAPACITORS

Part No.	Symbol & Description
CKDYA222K50	C1, C5, C18, C22
CCDSH030D50	C2
CCDSL330J50	C3
CKDYF223Z25	C4, C11
CCDSH060D50	C6
CCDCH030D50	C7
CGB010K500	C8
CCDCH100F50	C9
CKDYB271K50	C10
CKDYF103Z25	C12-C15, C24, C80, C88
CCDTH030D50	C16
CCDTH050D50	C17
CCDRH100F50	C19
CCDSH330J50	C20
CCDTH120J50	C21
CSZA010M25	C23, C73, C86, C90
CKDYF473Z25	C25-C29, C31
CSZAR47M35	C30, C32, C60, C61, C74
CSZAR33M35	C33, C63
CCDSL101K50	C34
CEA100M16L	C35, C36, C55, C82, C85
CEA101M10L	C37, C52, C54, C62, C70, C79, C83, C84
CCDSL050D50	C38
CKDSA271J50	C39-C42
CKDSA681J50	C43, C44
CQMA122K50	C45
CKDSA680J50	C46
CQMA682J50	C47
CKDSA561J50	C48, C49
CKDSA102J50	C50
CQMA152J50	C51
CQMA103K50	C53
CQSAH152J50	C56
CQMA473K50	C57
CQMA153J50	C58, C59, C65, C66
CSZA0R1M35	C64
CQMA472K50	C67
VACANT	C68, C77, C78
CQMA102K50	C69
CSZA2R2M16	C71, C76
CCDCH080F50	C72
CSZA4R7M16	C75
CEA221M10L	C81
CEA220M16L	C87
CEA221M16L	C89

AM/Audio Unit

MISCELLANEOUS

Part No.	Symbol & Description	
RC3403ADB	IC1	
LAP-502	IC2	
2SK19-Y	Q1	
2SA786-R	Q2	
2SC535-B	Q3	
2SC460-B	Q4, Q5	
2SK49-H2	Q6	
2SB562	Q7, Q8	
2SC1815 or 2SC1740LN	Q9, Q11, Q12	
2SA733 or 2SA826	Q10	
ITT73N	D1	
1S2222	D2, D3	
1S1555	D4, D7, D9	
KV1210	*D5	
MV-1	D6	
VACANT	D8, D14	
1S1555 or 1S2076 or 1S2473VH or W03A or W03B or W03C	D10-D13, D15-D23	
VACANT	D24	
CTB-081	L1	
CTH-049	L2	Coil, 2.2μH
CTF-108	L3	Coil
T24-030	L4	Coil, 220μH
CTB-078	L5	Ferri-Inductor, 100μH
	T1	Coil

20

9. PARTS LIST

NOTE:
When ordering resistors, first convert resistance values into code form as shown in the following examples.

Ex. 1 *When there are 2 effective digits (any digit apart from 0), such as 560 ohm and 47k ohm (tolerance is shown by J = 5%, and K = 10%).*

560Ω	*56×10¹*	*561*	*..... RD1/4PS 5 6 1 J*
47kΩ	*47×10³*	*473*	*..... RD1/4PS 4 7 3 J*
0.5Ω	*OR5*		*..... RN2H Q R 5 K*
1Ω	*010*		*..... RS1P 0 1 0 K*

Ex. 2 *When there are 3 effective digits (such as in high precision metal film resistors).*

5.62kΩ *562×10¹* *..... RN1/4SR 5 6 2 1 F*

- *Parts whose parts numbers are omitted are subject to being not supplied.*

Control/FM Unit

MISCELLANEOUS

Part No.	Symbol & Description
CWW-014	IC1 (IC & Ceramic Filter)
LA1230P	IC2
LA2101	IC3
LA3350P	IC4
PST-506	IC5
M54832P	IC6
VACANT	IC7
PD4003	IC8
PD1002	IC9
SD306PA	Q1
2SC1674	Q2
2SC1675-M	Q3
2SC1815	Q4, Q7, Q8, Q12, Q13
2SB743	Q5
2SC1583	Q6, Q11
2SA952	Q9
2SA798	Q10
ITT310PD or ITT310PC	D1-D3
1S2790	D4
MV-11	D5, D6
1S1555 or 1S2076	D7, D8, D10, D16
WZ-061	D9
XZ-072	D11
VACANT	D12
MV-1	D13, D15, D17, D18
YZ-074	D14
XZ-062	D19
SIB01-01 or SIB01-02 or ERB15-01 or W03A or W03B or W03C	D20

Part No.	Symbol & Description	
CTC-092	L1, L2	Coil
CTC-093	L3	Coil
CTF-015	L4	Ferri-Inductor, 0.82μH
CTF-016 or CTF-078	L5	Ferri-Inductor, 15μH
CTF-039 or CTF-076	L6	Ferri-Inductor, 2.7μH
CTC-094	L7, L8	Coil, 680μH
CTC-106	L9	Coil, 330μH
CTF-112	L10	Coil, 4.7mH
CTC-043	T1	IF Transformer
CTC-090	T2	Coil
CTC-091	T3	Coil
CCX-001	CR1	2200pF/1kΩ
CWW-026	CR2	0.01μF/470Ω
CWW-032	CR3	0.01μF/22kΩ
CWW-031	CR4	0.01μF/10kΩ
CWW-033	CR5	0.01μF/47kΩ
CWW-043	RA1	3.3kΩ × 5
CCL-068	CG1	Capacitor (with discharge gap)
CCG-038	TC1-TC3	Ceramic Trimmer, 10pF
C92-618	VR1, VR2	Volume, 4.7kΩ (B)
CCP-094	VR3	Volume, 2.2kΩ (B)
CCP-051	VR4	Volume, 680Ω (B)
CSG-122	S1	Switch
CTX-022	Beaded Core	

Part No.	Symbol & Description	
CTB-073	T2	Coil
CTE-092	T3	IF Transformer
CTE-093	T4	IF Transformer
CTB-080	T5	Coil
CTF-100	CF1	Ceramic-Filter
C43-607	TC1, TC2	Ceramic Trimmer, 20pF
CSG-131	S1	Switch
CSC-016	S2, S3	Switch
CSG-099	S4	Switch
CCP-063	VR1	Volume, 68kΩ (B)
CCS-217	VR2, VR3	Volume, 100kΩ (B)
CSR-013	RL1	Relay

RESISTORS

Part No.	Symbol & Description	
RD1/4VS□□□J	R1, R2, R8, R9, R11-R14, R16-R58, R61-R72, R75, R76, R79-R88	
VACANT	R3-R7, R15, R59, R60, R73, R74, R77	
CCN-054	R10	27kΩ
RD1/4PS101J	R78	
CCN-068	R89, R90	10kΩ (1/10W)
CCN-056	R91	0Ω

CAPACITORS

Part No.	Symbol & Description
CKDYB471K50	C1, C4, C18
VACANT	C2, C61, C62
CKDYB121K50	C3
CSZA4R7M16	C5
CKDBC104M12	C6
CQMA683M50	C7, C60
CEA010M50L	C8, C35, C36
CCDSL010C50	C9
CKDBC473M25	C10, C21, C23
CKDYD103M50	C11
CCDPH271J50L	C12
CCDPH201J50L	C13
CCDCH030C50 or CCDCH040D50 or CCDCH050D50 or CCDCH060D50	*C14
CCDVK100F50	C15
CEA330M16	C16, C59
CEAH100M16L	C17
CCDVK330J50	C19
CKDYA222K50	C20
CKDYF103Z25	C22
CEA221M10L	C24, C55
CEAH470M10L	C25
CQMA103M50	C26
CQMA183M50	C27
CSZA0R1M35	C28
CKDYB101K50	C29, C30
CQMA102K50	C31, C32, C37, C38, C41, C42
CQMA122K50	C33, C34
CQMA223K50	C39, C40
CCDSL330K50	C43, C44
CEA100M16L	C45, C46, C53, C54
CQMA152K50	C47, C48
CSZAR15M35	C49, C50
CEAH010M50	C51, C52
CEA221M16L	C56, C63
CEA2R2M50L	C57
CEA4R7M25L	C58
CSZA010M25	C64

Caution:
Diode *D5 and capacitor *C14 used mutually in the following assembly.

D5	C14
KV1210-A	CCDCH030C50
KV1210-B	CCDCH040D50
KV1210-C	CCDCH050D50
KV1210-D	CCDCH060D50

Switch (CSG-132)

Part No.	Symbol & Description	
———	D1	LED Array
SG2-04B	D2	LED
PR3433S	D3	LED
PG3433SX	D4	LED
AY3433S	D5	LED
———	D6-D10	LED
CEL-080	IL1	Lamp, 8V 60mA

PARTS LIST

Filter Unit (CWX-344)

Part No.	Symbol & Description	
CTF-113	L1	Coil, 100μH
CCL-091	C1	Feed through Capacitor
E21-007	FU1	Fuse, 0.5A

Volume Unit

Part No.	Symbol & Description	
CCS-218	VR1	Volume, 50KΩ (M, N)/20KΩ (B)

Miscellaneous Parts List

Part No.	Symbol & Description	
CWM-038	Generator Unit	
CTB-068	L1	Coil, 10μH
CDE-619	J1	Connector
CDE-620	J2	Connector

Cabinet

Key No.	Part No.	Description
1.	B90-023-E	BM3 × 6
2.	CNB-533	Case
3.	B10-863-A	BM3 × 6
4.	CNB-537	Case
5.	CXB-982	Grille Unit
6.	CBE-086	FW7.2ø × 0.5t
7.	CBA-067	N6ø × 2t
8.	CAA-304	Knob
9.	CAA-303	Knob
10.	CBF-091	FW6.2ø × 0.5t
11.	CBA-066	N7ø × 2t
12.	CAA-160	Knob
13.	CAA-291	Knob
14.	CAA-292	Knob
15.	CNS-608	Panel

Chassis

Key No.	Part No.	Description
1.	CDH-043	Antenna Cable
2.	B10-811-A	BM2.6 × 6
3.	CNE-541	Clamper
4.	B10-863-A	BM3 × 6
5.	CNE-540	Clamper
6.		Panel
7.		P.W. Board
8.		Shield
9.	CXB-928	Friction Unit
10.	CXB942	Tuning Shaft
11.	CWX-344	Filter Unit
12.	CCL-091	Feed through Capacitor
13.		P.W. Board
14.	E21-007	Fuse, 0.5A
15.	CDE-671	Cord
16.	CBE-086	FW7.2ø × 0.5t
17.	CBA-067	N6ø × 2t
18.		Chassis
19.		Holder
20.	CDE-619	Connector
21.	CDE-620	Connector
22.		Holder
23.	CWM-038	Generator Unit
24.	B10-816-A	BM2.6 × 16
25.		Insulator
26.	CSG-131	Switch
27.	CAA-309	Button
28.	CAA-300	Button
29.	CAA-310	Button
30.	B10-810-A	BM2.6 × 5
31.	CBF-091	FW6.2ø × 0.5t
32.	CBA-066	N7ø × 2t
33.	B10-803-A	BM2 × 5
34.		Plate
35.	CSC-016	Switch
36.	CCS-217	Volume, 100kΩ (B)
37.	CKS-059	Plug
38.	CKS-060	Plug
39.	CAA-301	Button
40.	CSG-099	Switch
41.	CDE-637	Connector
42.	CKS-068	Plug
43.		P.W. Board
44.	CKS-058	Plug
45.	CSG-132	Switch
46.	SG2-04B	LED
47.	AY3433S	LED
48.	PG3433SX	LED
49.	PR3433S	LED
50.	CEL-080	Lamp, 8V 60mA

Key No.	Part No.	Description
51.		P.W. Board
52.	CKS-066	Plug
53.	CCS-218	Volume, 50kΩ (M,N)/20kΩ(B)
54.		Holder
55.	CDE-622	Connector
56.	B10-804-A	BM2 × 6
57.	CDE-624	Connector
58.	CDE-623	Connector
59.	CDE-621	Connector
60.	CKS-065	Connector
61.	CAA-302	Button
62.	CSG-122	Switch
63.		P.W. Board
64.	2SB743	Transistor
65.	CNM-558	Insulating Plate
66.		Heat Sink
67.		Insulator

Packing Method

Key No.	Part No.	Description
1.	CRD-089	Installation Manual
2.	CRD-087	Owner's Manual
	CRD-088	Owner's Manual
3.	CNS-608	Panel
4.	CHB-689	Styrofoam (1 set pair)
5.	CEG-113	Cover
6.	CNB-198	Mounting Bracket
7.	CEA-250	Accessory Kit
7-1.	CNC-975	Strap
7-2.	CDE-437	Cord
7-3.	CEA-208	Screw Kit
7-3-1.	CBA-028	Screw for Strap
7-3-2.	B90-064-A	Screw, M4 × 8
7-3-3.	B90-065-A	PSB5 × 16
7-3-4.	B70-055-A	WN4Ø × 4.5t
7-3-5.	B70-056-A	WN5Ø × 5.3t
7-3-6.	B20-013-A	SW4Ø × 1t
7-3-7.	B10-863-E	BM3 × 6
8.	CEA-326	Accessory Kit
8-1.	CNE-610	Bracket
8-2.	CNE-611	Bracket
8-3.	CEA-327	Bolt Spanner Assy
8-3-1.	CBA-091	Bolt
8-3-2.	CBX-005	Spanner
8-3-3.	B01-880	BM4 × 16
9.	CHB-639	Carton

3.5 AM IF ADJUSTMENT

• Connection Diagram

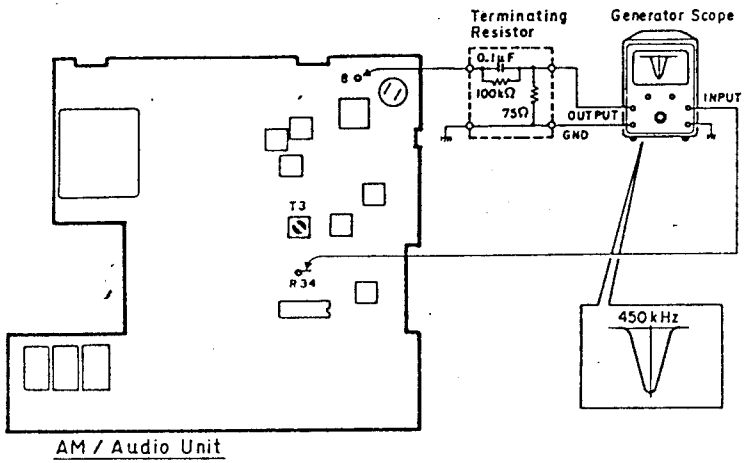


Fig. 9

• To Adjust

1. Set Generator Scope as follows:
   Frequency centering on sweep ..... 450 kHz
   Input level 0.3Vp-p/cm
   Output level ..... 3mV ~ 10mV
2. Tune to a nearby, 1,600 kHz station.
3. Turn the cores of T3, and adjust so that U-curve will be at maximum amplitude and best symmetry.

3.6 AM TRACKING ADJUSTMENT

• Connection Diagram

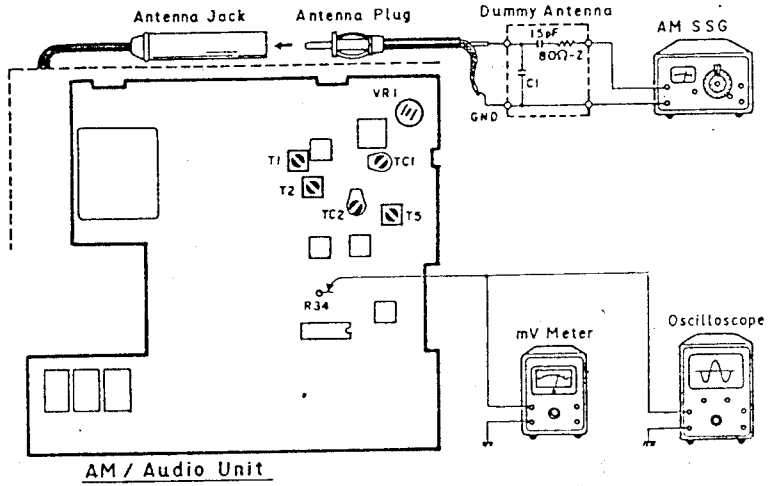


Fig. 10

NOTICE:
Select C1 so that total capacity of 80pF is attained from the direction of the receiver jack.
Z: Output impedance of the S.S.G.

• To Adjust

SSG Frequency	Pointer Position	Adjustment Point	Note
1. 1,630 kHz (400 Hz, 30% modulation), output level 30 dB (μV)	Maximum	T5	1,630 kHz can be received
2. 515 kHz (400 Hz, 30% modulation), output level 30 dB (μV)	Minimum	VR1	515 kHz can be received
3. 600 kHz (400 Hz, 30% modulation), output level 30 dB (μV)	Tune to 600 kHz	T1, T2	mV meter at maximum
4. 1,400 kHz (400 Hz, 30% modulation), output level 30 dB (μV)	Tune to 1,400 kHz	TC1, TC2	mV meter at maximum
5. Repeat items (3) and (4) alternately so that the mV meter indicates maximum output.			